

Imaging diagnosis

Case 379

3. Biliary stone or sludge comes from administration of Ceftriaxone

【Progress】

Ceftriaxone administration was ceased, expecting natural disappearance of biliary stone or sludge.

【Discussion】

Ceftriaxone is one of the 4th generation antibiotics. Ceftriaxone is excreted through kidney as urine in 60% and through liver as bile in 40% (1-4). The percentage of bile excretion elevates in case of renal disorder. The longer and the greater administration of Ceftriaxone causes to create minute crystal by binding calcium into biliary tract sludge and stone. The less 1mg/dL or less is reported not to cause formation of biliary sludge (4).

It is reported that Ceftriaxone causes to create bile sludge or bile stone in 15 to 60% (4-9). Ceftriaxone is an antibiotics that pass to biliary tract, and its concentration of Ceftriaxone reaches 20-150 fold compared to blood concentration (10, 11). Dehydration and renal disorder are triggers to rise concentration of Ceftriaxone, inducing predominant forming of biliary sludge and biliary stone.

We experienced a similar case with gall bladder stone by Ceftriaxone administration 1g/day for five days after appendectomy. In general, gallstone formation is usually preceded by the presence of biliary sludge like viscous gel which composed of cholesterol and calcium bilirubinate (12). Biliary sludge becomes nucleus of gallstone. In short, cholesterol is insoluble in water but soluble in bile acid. The basic mechanism is oversaturation with cholesterol in bile exceeding the maximum solubility (12). As the cholesterol concentration increases, cholesterol crystal begins to form as the nucleus of gallstone. It is known that up to 90 percent of gallstones are cholesterol (more than 50 percent cholesterol) or mixed (20 to 50 percent cholesterol) gallstones (12). The remaining 10 percent of gallstones are pigmented stones (12). Ceftriaxone binds calcium resulting in insoluble crystals in bile (2). Because this sludge is not relevant with cholesterol and promptly dissolution of the sludge after the disconnection of ceftriaxone, ceftriaxone-induced sludge is termed pseudolithiasis (11). However, this sludge is reported to be capable of being nucleus of gallstone and causing occlusion in case of no disconnection (8). In our case, ceftriaxone was stopped four days later, his abdominal pain nausea improved promptly, and amylase and hepatobiliary enzymes returned to normal range.

Our patient is associated with renal disorder and dehydration. Then, the environment of forming biliary sludge after administration of Ceftriaxone was ready. After the cessation of Ceftriaxone administration biliary sludge or stone is expected to disappear, natural extinction.

【Summary】

We presented an eighty-seven-year-old female for fever and general fatigue who received Ceftriaxone, and later gall bladder sludge and common bile duct stone emerged. It is borne in mind that Ceftriaxone causes biliary sludge or stone, mixed with calcium, predominantly under dehydration and renal disorder. The cessation of Ceftriaxone induces dissolvment of biliary sludge, natural extinct. We experienced a similar case with biliary sludge after Ceftriaxone administration in Case 32.

【References】

1. Lee SP, et al. Biliary Sludge as a Cause of Acute Pancreatitis. *N Engl J Med* 1992; 326:589-593.DOI: 10.1056/NEJM199202273260902
2. Moseley RH. Hepatotoxicity of antimicrobials and antifungal agents. In, Kaplowitz N, DeLeve LD, eds. *Drug-induced liver disease*. 3rd ed. Amsterdam: Elsevier, 2013. p. 463-83.
3. Prásil P, et al. Penetration of ceftriaxone into the cerebrospinal fluid and its relationship to inflammatory markers during bacterial meningitis *Klin Mikrobiol Infekc Lek*. 2010;16 :64-72.
4. File TM et al. Clinical evaluation of ceftriaxone. *Clin Ther* 1984; 6: 653-61. PubMed Citation .
5. Barson WJ, et al. Prospective comparative trial of ceftriaxone vs. conventional therapy for treatment of bacterial meningitis in children. *Pediatr Infect Dis* 1985; 4: 362-8.
6. Barson WJ, et al. Prospective comparative trial of ceftriaxone vs. conventional therapy for treatment of bacterial meningitis in children. *Pediatr Infect Dis* 1985; 4: 362-8.
7. Oakes M, et al. Abnormal laboratory test values during ceftriaxone therapy. *Am J Med* 1984; 77: 89-96.
8. Moskovitz BL. Clinical adverse effects during ceftriaxone therapy. *Am J Med* 1984; 77 (4C): 84-8. PubMed Citation
9. Parry MF. Toxic and adverse reactions encountered with new beta-lactam antibiotics. *Bull N Y Acad Med* 1984; 60: 358-68.
10. Schaad UB, et al. Transient formation of precipitations in the gallbladder associated with ceftriaxone therapy. *Pediatr Infect Dis J* 1986; 5: 708-10.
11. Kirejczyk WM, et al. Disappearing “gallstones”: biliary pseudolithiasis complicating ceftriaxone therapy. *AJR Am J Roentgenol*1992 ;159 :329-30.
12. Ahmed, A, et al. Management of Gallstones and Their Complications *Am Fam Physician*. 2000; 61: 1673-1680.

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